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# Apparent per capita Fish and Seafood Consumption in Quebec, 1990

**Economic and Commercial Analysis Report n° 118**

Pêches et Océans
Fisheries and Oceans

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# Apparent per capita Fish and Seafood Consumption in Quebec, 1990

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## ABSTRACT

Consumption of fish and seafood in Quebec reached 7.08 kg of edible weight per person in 1990. There is a marked preference for frozen and canned marine products over fresh or lightly transformed (marinated, cured, dried) products. Groundfish, in either the fresh or frozen form, are the most frequently consumed species of fish. Pelagics are the second most popular group of species and the only category where fresh products are more popular than frozen. Finally, molluscs and crustaceans are in third rank in terms of total consumption both with respect to edible and gross weight.



## SOMMAIRE EXECUTIF

Pour 1990, la consommation québécoise de poissons et de fruits de mer s'élève à 7,08 kg par habitant, en poids comestible. Les Québécois préfèrent les produits marins congelés et en conserve par rapport à ceux qui sont frais et traités (marinés, salés, séchés). Les poissons de fond représentent la plus grande proportion de la consommation totale, que ce soit sous forme fraîche ou congelée. Les pélagiques se classent au second rang de la consommation et constituent la seule catégorie dont les produits se consomment davantage frais que congelés. Finalement, les mollusques et crustacés occupent le troisième rang de la consommation totale, autant en poids comestible qu'en poids brut.

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# INTRODUCTION

For the past several years, the Economic Services Division of the Department of Fisheries and Oceans (DFO) has regularly been receiving requests for detailed data on the consumption of fish and seafood in Quebec. The growing number of requests from various key players in the agri-food sector justified the need to identify this consumption, especially since no agency seemed able to meet the demand. Until recently, the consumption of marine products was a relatively unknown aspect of the Quebec fishing industry, since only global estimates of provincial consumption were available.

There can be no doubt as to the usefulness of statistics on the consumption of fish and seafood in Quebec. Knowledge of consumer habits in Quebec would enable the Quebec fishing industry to more efficiently focus the marketing of its products and the promotional initiatives of industry key players could be more directly targeted towards specific products and groups. This means that a better planning of production could be considered so as to more properly meet the clientele's needs. At the same time, the availability of information on the consumption of marine products in Quebec would help guide managers in their decision-making.

The first chapter of this report will describe the methodology used by the Economic Services Division, as well as the limitations of the survey. The second chapter deals with the consumption of fish and seafood in Quebec, and the last section considers prospects for the consumption of seafood products in the coming years.

Finally, we would like to thank the Statistics and Informatics Division of the Department of Fisheries and Oceans for its invaluable cooperation in carrying out this survey. We would also like to thank the marine products wholesalers of Quebec for their readiness to provide information during the gathering of data on interprovincial trade.

## 1. METHODOLOGY AND CONCEPTS

Our first step was to do an inventory of the methods used to calculate the consumption of fish and seafood[1] to determine which one would be most appropriate for our purposes. Several organizations currently publish data on the consumption of marine products:

a) At the international level, the Organization for Economic Co-operation and Development (OECD) and the Food and Agriculture Organization (FAO) determine the consumption of marine products in member countries;

b) At the national level, Statistics Canada (STATCAN) prepares statistics for the country as a whole;

c) In the province of Quebec, the provincial department of agriculture, fisheries and food, the Ministère de l'Agriculture, des Pêcheries et de l'Alimentation du Québec (MAPAQ), identifies the consumption of fish and seafood in Quebec;

d) In the United States, the National Marine and Fisheries Service (NMFS) estimates American consumption.

A brief description of the methodology used by OECD, FAO, STATCAN and MAPAQ is found in appendix 1. No particular attention was given to the methodology used by the NMFS, apart from the use of its results for comparison purposes in our study.

---

[1] For ease of reading, the term "apparent human consumption of fish and seafood" has been shortened to consumption of fish and seafood. Human consumption is often described as apparent for two main reasons. Firstly, it refers to the fact that calculations take in the whole of the population, including those who do not consume seafood products. Secondly, institutional losses (hospitals, restaurants and other institutions) are not taken into account.

## 1.1 Economic Services Division: similarities and differences

If we wanted the results of our calculations on the consumption of marine products to be comparable with those of various agencies, it was essential that we use a common-based methodology. The Division therefore adapted the methodology most often used by the above organizations to take into account the specific needs of the survey.

The formula adopted by the Division can be mathematically expressed as follows:

$$\frac{\text{PROD.} + \text{STOCKS} + \text{IMPORT} - \text{EXPORT} + \text{INTERPROV.} - \text{OTHER USES}}{\text{POPULATION}}$$

In which

**PROD.=** Quebec production of marine products in the year considered;

**STOCK=** Net variation in Quebec inventories in the year considered;

**IMPORT=** Imported fish and seafood entering Quebec and coming from outside Canada;

**EXPORT=** Quebec marine products exported outside Canada;

**INTERPROV.=** Interprovincial purchases of fishery products from other Canadian provinces;

**OTHER USES=** Marine products used for purposes other than human consumption;

**POPULATION=** Population of Quebec in the year considered.

The methodology chosen by the Economic Services Division and those used by the OECD and STATCAN bear some similarities. To begin with, they are all in agreement on the definition of the term production. The Statistics and Informatics Division of the Department of Fisheries and Oceans describes production as any primary processing operation by a plant or any sales activity involving a product purchased by a dealer directly from fishermen. Moreover, all three organizations have eliminated marine products not for human consumption (bait, meal, oil) from their calculations.

However, there are significant differences in the methodology used by the Economic Services Division. Contrary to OECD, it did not consider variations in stocks within a year in making its calculations, since the high degree of perishability of marine products implies a high inventory turnover rate. The seasonality of our industry also means that end-of-year inventories are negligible.

The terms import and export should also be clarified. Quebec imports are marine products from outside Canada that enter the country through Quebec, while Quebec exports mean the quantities of marine products shipped to foreign countries from Quebec. These exports are compiled by province of origin of the product, which makes the problem of compiling Quebec exports less difficult. Thus, fish caught in New Brunswick and exported via Quebec will not be recorded as a Quebec export, but as a New Brunswick export.

But in trying to determine the Quebec consumption of fish and seafood, the Division was faced with the problem of commercial transactions between provinces. The concern was all the greater since the literature regularly reports that some share of marine products consumed in Quebec come from other Canadian provinces. However, no organization had data on interprovincial trade. When an organization like STATCAN, FAO or the OECD estimates consumption for a country, interprovincial or inter-regional exchanges are not a factor, since the products remain within national borders.

Approximately 85% of the marine products wholesalers in Quebec were consulted to determine how much of their purchasing was done in other Canadian provinces. Special attention was paid to the double counting of interprovincial purchases. This is because several wholesalers surveyed obtained their stocks from other wholesalers who were also taking part in the survey, which meant that these purchases had already been accounted for. Consequently, wholesalers whose suppliers purchased products within Quebec only were not surveyed.

Moreover, only the Division uses the specific STACAC conversion factors for each species to determine the edible portion of marine products. Thus, parts of the fish that are normally not eaten, such as bones, heads and viscera, are eliminated from the consumption estimates, which makes our calculations even more accurate. Thus, throughout this documents data on consumption of marine products in Quebec are expressed in edible weight, except in a few clearly-marked places, where the gross weight is used for comparison purposes.

Our interviews with wholesalers did not enable us to zero in on interprovincial trade in canned products, which use quite specific distribution channels. Nonetheless, it was essential to estimate the consumption of canned products if we wanted to obtain a realistic picture of the total consumption of marine products in Quebec. This was necessary due to the extensive consumption of canned products, especially salmon, tuna and shrimp. Without this factor, the consumption of these species would have been markedly under-estimated. Moreover, it would not have been possible to correctly rank the consumption of these species.

We could not, unfortunately, find specific data on this subject, so we presumed that the eating habits of Quebec residents in regard to canned fish was similar to that of Canadians in general. The per capita consumption of canned products, estimated by STATCAN in 1990 to be 1.55 kg, was retained. Estimations of the quantities of canned salmon, tuna and shrimp were made possible through the cooperation of the four largest grocery chains in Quebec. Store buyers assessed what proportion of total sales of canned fish these three products represented. On average, canned salmon represented 45% of the market, while tuna and shrimp made up 40% and 10% respectively of sales. To determine the consumption of these three species of canned fish, as expressed in kilograms, STATCAN statistics were multiplied by the ratios supplied by the grocery chains.

### 1.1.2 Limitation to estimates of the Quebec consumption of fish and seafood.

The Economic Services Division encountered a few obstacles during the course of the survey. Much effort was put into reducing, as much as possible, the impact of these problems on the consumption estimates. Nonetheless, some margin of error could not be eliminated. Readers of this document should keep in mind the following limitations:

- The province of entry for Quebec imports of **certain products** such as shrimp and exotic fish (parrot-fish, tilapia, shark, squid, octopus, etc) remains difficult to identify. Apparently, some share of these products consumed in Quebec enter Canada through Ontario. But these products are not included with Quebec imports since they did not enter the country in Quebec. We therefore had to establish an approximation, with the help of key players, of the proportion of exotic products entering through Ontario.

- Although wholesalers have a very good knowledge of their operations, some of the information on interprovincial purchases consisted of estimates.

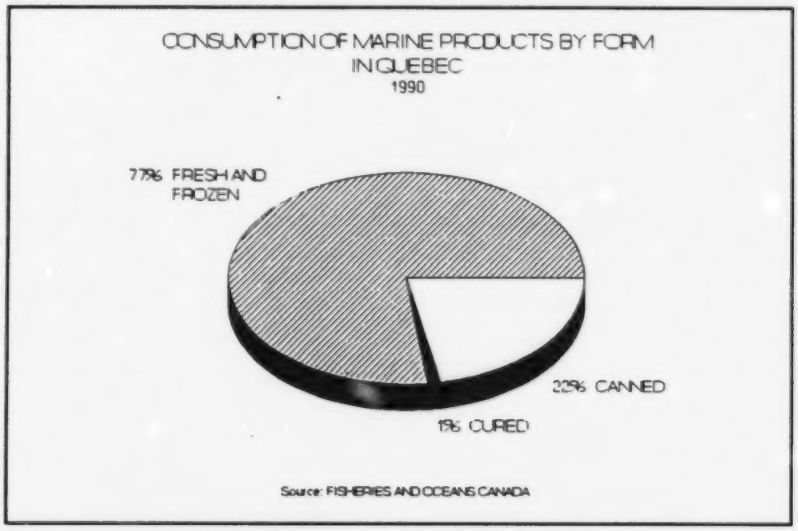
- Interprovincial purchases could be tallied relatively easily, but it was impossible to put a figure on interprovincial sales. Marine products imported into or fished in Quebec may be consumed outside the province. Due to a lack of information, they had to be included in Quebec consumption in this case. However, according to key players, these quantities would be unlikely to substantially alter the results.

- Despite the considerable efforts made, it was impossible to calculate the total consumption of canned products in Quebec. As canned tuna, salmon and shrimp make up a large volume of the fish consumed, it was essential to obtain some global estimate of the quantities, as described in the methodology. Therefore, data on the consumption of these three species are less precise than the rest, given that they are based on estimates.

Even with the limitations described above, the results of our calculations are accurate, and given the information available to date, do improve our knowledge of the consumption of seafood products in Quebec.

## 2. CONSUMPTION OF FISH AND SEAFOOD IN QUEBEC IN 1990.[2]

Chart 1




In 1990, consumption of fish and seafood in Quebec was 7.08 kg[3] of edible weight per person. This includes the consumption of canned fish, estimated nationally to be 1.55 kg per person in 1990. This means that the consumption of fish in Quebec breaks down as follows: 77% fresh and frozen fish, 1% cured fish (smoked, salted, marinated) and 22% canned, which are basically the same proportions established by MAPAQ for 1989.

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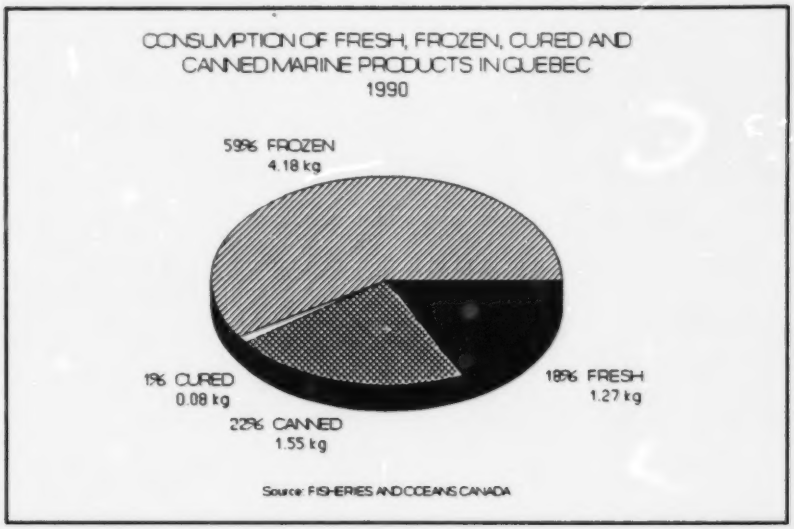
[2] All results are expressed in edible weight, unless otherwise indicated.

[3] Appendix B gives a detailed description of the steps in the calculation of the Quebec consumption of marine products

Chart 2




Moreover, Quebecers seem to clearly prefer frozen marine products[4]. More than 59% of the marine products consumed are purchased in this form, for a total of 4.18 kg per inhabitant. This choice is influenced by several factors. In general, the prices of frozen products are lower than the price of fresh fish. A survey[5] done for the Association Québécoise de l'Industrie de la Pêche also points out that the frozen market meets different needs among consumers, since these products have the advantage of being less perishable. In addition, breaded products make up a considerable share of the market among children and in the fast food industry.

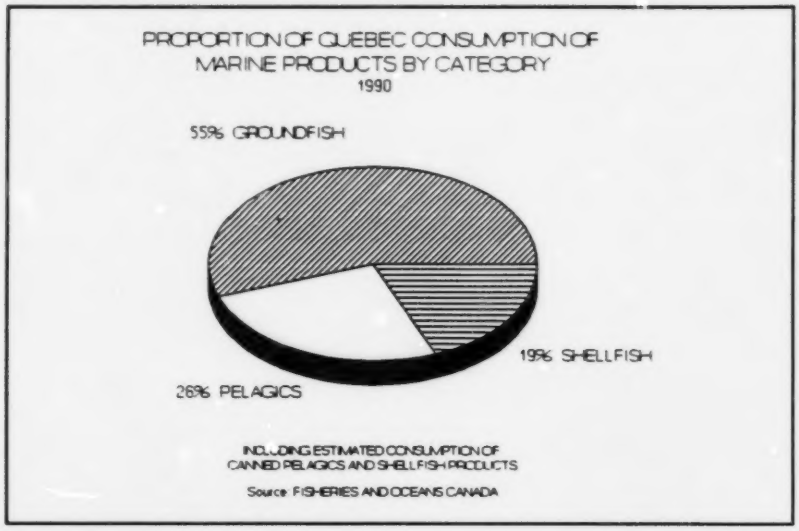
On average, Quebec residents consume 1.27 kg of fresh fish per capita and 0.08 kg of cured fish (salted, dried, smoked, marinated) annually. It seems that sales of fresh fish have been growing in the last few years, cutting in on the frozen product market. This increase is due to a number of factors, including an increase in sales outlets, improved availability and variety of products, changes in eating habits and tighter controls over health and hygiene. As for cured fish, it seems to be mainly popular among ethnic Quebecers, which are rising each year in the major urban centres of the province.

---

[4] Appendix C contains a detailed description of the consumption of marine products by species and form.

[5] Stratem. Situation des produits marins sur les marchés de détail et institutionel de Montréal et Toronto. June 1991, 23 pp.

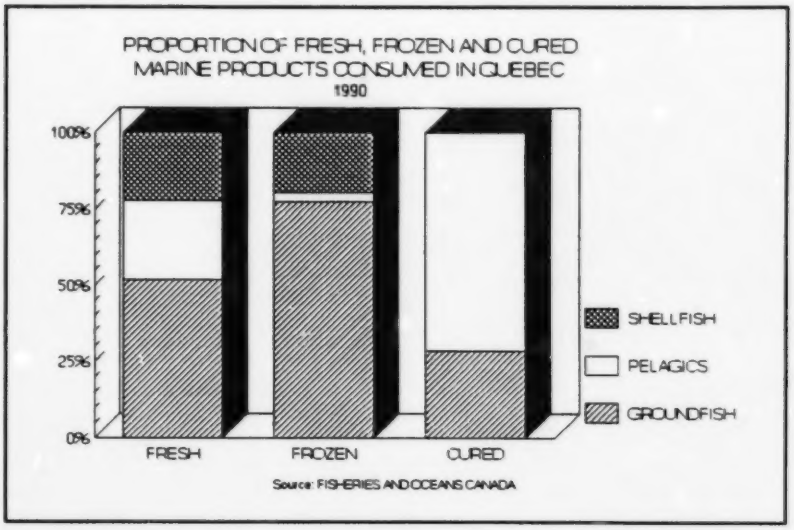
Chart 3


PROPORTION OF QUEBEC CONSUMPTION OF MARINE PRODUCTS BY CATEGORY
1990
55% GROUNDFISH
19% SHELLFISH
26% PELAGICS
INCLUDING ESTIMATED CONSUMPTION OF CANNED PELAGICS AND SHELLFISH PRODUCTS
Source: FISHERIES AND OCEANS CANADA

The residents of Quebec may be categorized as groundfish eaters. This category makes up more than 55% of the total consumption of marine products, accounting for 3.93 kg. per inhabitant. Pelagics[6] come second with an annual consumption of 1.83 kg per inhabitant, and this includes canned products. Finally, shellfish make up the smallest share of consumption, in edible weight, with 1.33 kg per inhabitant, canned products included.

[6] See Appendix E for a list of the main species included in this category.

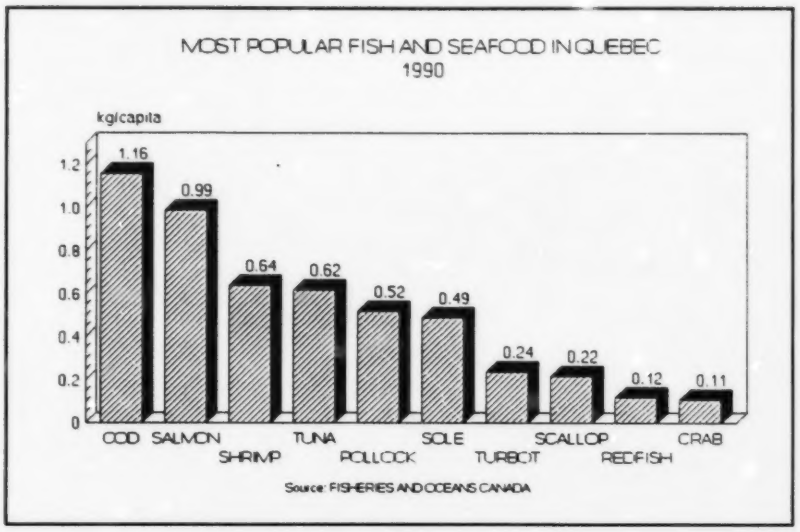
Chart 4




It should also be noted that even if we exclude canned products, groundfish in all forms, especially cod, is the most popular category of fish. Other interesting facts are that more shellfish than pelagics are purchased frozen, and that pelagics are the only category in which the consumption of fresh products exceeds frozen. This is largely due to the rising popularity of fresh Atlantic salmon as a result of its low price.

## 2.1 Public favourites[7]

Chart 5




Of all the species consumed in Quebec, cod, at 1.15 kg per inhabitant, ranks first in terms of edible weight. This groundfish alone represents 22% of the consumption of the ten most popular species. Salmon is a close second while shrimp and tuna are almost neck and neck for third place, if we take into account the consumption of canned products, as mentioned in the methodology. Pollock, ranked fifth, reflects a new trend towards surimi-based products. Sole is sixth with 0.49 kg per inhabitant. Some distance behind is turbot, at 0.24 kg, and scallop in eight place, while redfish and crab are ranked ninth and tenth, with consumptions of 0.12 and 0.11 kg respectively per capita.

### 2.1.1 Comparison of results based on edible weight and gross weight

It is interesting to note that the list of most popular species differs considerably when consumption is expressed in gross weight on purchase. On this basis, shellfish rank much higher. Lobster, shrimp, crab, mussels and oysters are among the twelve species most consumed in Quebec in terms of gross weight, whereas they are barely noticeable when edible weight is considered. For example, only 23% of a whole lobster (in the shell) is really edible.

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[7] A more complete list of the consumption of marine products may be found in Appendix D.

**TABLE 1: MOST POPULAR FISH AND SEAFOOD IN QUEBEC IN 1990[8]**

| Ranking | EDIBLE WEIGHT kg/inhabitant | | GROSS WEIGHT (purchased) kg/inhabitant | |
|---|---|---|---|---|
| 1 | Cod | 1.16 | Cod | 1.32 |
| 2 | Salmon[1] | 0.99 | Salmon[1] | 1.27 |
| 3 | Shrimp[1] | 0.64 | Shrimp[1] | 0.80 |
| 4 | Tuna[1] | 0.62 | Tuna[1] | 0.62 |
| 5 | Pollock[2] | 0.52 | Sole | 0.53 |
| 6 | Sole | 0.49 | Pollock[2] | 0.52 |
| 7 | Turbot | 0.24 | Lobster | 0.49 |
| 8 | Scallop | 0.22 | Turbot | 0.27 |
| 9 | Redfish | 0.12 | Scallop | 0.27 |
| 10 | Crab | 0.11 | Crab | 0.22 |
| 11 | Trout[3] | 0.10 | Mussels | 0.19 |
| 12 | Lobster | 0.09 | Oysters | 0.16 |

1 The results include estimates of canned fish.

2. Approximate species totals taken from Other groundfish section

3. Approximate species totals taken from Other pelagics.

---

[8] Appendix D details the consumption of 21 species of fish and seafood in Quebec, by edible weight and by gross weight.

## 2.2 Comparison of most popular products in Quebec and the U.S. in 1990.

Evidently, the eating habits of Quebec inhabitants in regards to marine products are different from those of Americans, although there are some similarities. Levels of consumption are similar at 7.08 and 7.00 kg per capita in Quebec and the United States respectively, while consumption of the five most popular species comes to 3.93 and 4.22 kg respectively. Moreover, the five same species are most popular in both markets.

However, there are several differences between Quebec patterns of consumption and those in the United States. Quebec inhabitants show a clear preference for cod and salmon, while Americans eat more tuna and shrimp. In addition, Americans eat a specie almost unknown in Quebec, catfish.

The following table compares the ten species most eaten in Quebec and in the United States. In the U.S., these ten species account for 75% of the American consumption of fish and seafood in 1990 (7 kg per capita), while in Quebec they represent 72%.

**TABLE 2: SPECIES PREFERRED BY INHABITANTS OF QUEBEC AND THE UNITED STATES IN 1990[1]**

| RANKING | QUEBEC | kg/inhabitant | UNITED STATES | kg/inhabitant |
|---|---|---|---|---|
| 1 | Cod | 1.16 | Tuna[3] | 1.68 |
| 2 | Salmon[2] | 0.99 | Shrimp[3] | 1.00 |
| 3 | Shrimp[2] | 0.64 | Cod | 0.63 |
| 4 | Tuna[2] | 0.62 | Pollock | 0.58 |
| 5 | Pollock | 0.52 | Salmon[3] | 0.33 |
| 6 | Flatfish | 0.49 | Catfish | 0.32 |
| 7 | Turbot | 0.24 | Clam | 0.28 |
| 8 | Scallop | 0.22 | Flatfish | 0.26 |
| 9 | Redfish | 0.12 | Scallop | 0.14 |
| 10 | Crab | 0.11 | Crab | 0.13 |

1 All data are expressed in edible weight.

2. These results include estimates of canned fish as mentioned in methodology.

3. Including canned fish.

Sources: Economic Services Division, Quebec Region, Department of Fisheries and Oceans.
National Fisheries Institute, Arlington, USA.

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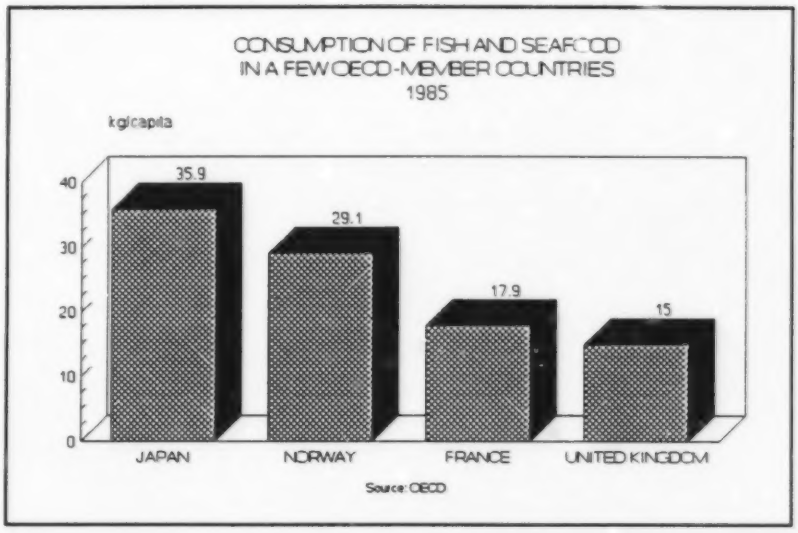
[1] All data are expressed in edible weight.

## 2.3 Comparison of the consumption of marine products between various OECD-member countries and Quebec.

Chart 6




It may be interesting to compare the consumption of marine products with that of certain OECD-member countries in 1985 (most up-to-date figures available from this organization). Based on the Quebec consumption of marine products in 1990, 7.08 kg per capita, Quebec consumed more or less the same quantity of fish and seafood as the North American continent as a whole. The consumption of marine products in Canada and the United States came to 7.2 and 7.1 kg per capita respectively. However, when we compare this to other countries, Quebec does not fare as well. The French and British consumed twice as many marine products as Quebec, with rates of 17.9 and 15.0 kg per capita. Norwegians, who consume an average of 29.1 kg each, eat three meals of approximately 190 grams of fish per week, as recommended by nutritional experts. And the Japanese, who eat 36 kg of fish per capita each year, can be considered among the greatest fish fanciers of the world.

In short, including fish in one's regular diet is apparently not part of most Quebecers' cultural background. This may explain the attitude of Quebec residents towards fish products. But despite this, wholesalers confirm that the buying habits of consumers have been changing in the last few years and that the barriers to the consumption of marine products are slowly crumbling away.

## 3. OUTLOOK FOR THE CONSUMPTION OF MARINE PRODUCTS

According to the wholesalers consulted, the marketing of marine products is in full restructuration. Considerable effort is being put into encouraging consumers to include more fish in their diets. The following action has already been taken:

- More attention is being given to the appearance of the products (improved fish displays);
- Staff is better trained and able to advise customers;
- Large grocery chains give more visibility to fish and seafood in their circulars;
- Fish and seafood are promoted in turn at sales outlets;
- The number of fresh product counters is increasing in supermarkets;
- The range of available products is expanding;
- The industry ensures that its products are fresher and more uniformly available;
- The marketing of the products (portions, presentation, variety, availability) is increasingly adapted to the ever-changing needs of consumers.

This series of factors can only have a positive impact on the Quebec consumption of marine products. The public's current concern for healthy eating is expected to further increase the popularity of fish. The question now is whether fish and seafood can benefit from this trend.

## CONCLUSION

This survey on the consumption of fish and seafood in Quebec was undertaken in response to many requests from various key players in the fishery and agri-food sector. Given the possible applications of these results, both in the private and public sectors, the pertinence of such a survey was easily established.

According to the results obtained, and taking into account the previously listed limitations, inhabitants of Quebec ate an average of 7.08 kg of fish and seafood in 1990. Of this total, the five most popular species accounted for 55%, or 3.92 kg per person. The strong point of our survey is the estimations of the consumption of the main species of marine products, since the only estimates to date had been for the total consumption of fish and seafood in Quebec. In addition, the Economic Services Division of Fisheries and Oceans is the first agency to deal with the problem of interprovincial purchasing of marine products in its calculations. Consequently, its results give a clearer indication of the marketing characteristics of seafood products in Quebec.

Nutritionists and marine product wholesalers agree that the consumption of white meats, including marine products, will tend to increase in the coming decades. More vigorous promotional efforts must be put into ensuring that fish and seafood benefit from this trend. Besides the nutritional quality of the marine products that have already been described in a report[9] by the Economic Services Division, other factors indicate an increase in the consumption of marine products in Quebec. The rise in the number of provincial residents with varying ethnic origins, for whom the consumption of marine products is part of their lifestyle, will surely have a positive impact on the consumption of fish and seafood in Quebec in the next few decades. The ageing of the Quebec population could also lead an increased consumption of marine products, provided their strong points (good digestibility, low fat and cholesterol content) are properly

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[9] Bourdages, J. Nutritional and Economic Aspects of Fish and Seafood. Economic and Commercial Analysis Report no. 117: 48 pp.

targeted in the promotion of the products. Finally, some people like to try new products, which may translate into a greater interest in fish and seafood so far unknown by the majority of the population. The availability of many exotic fish allows more daring Quebecers to discover new species of fish.

We hope that future promotional initiatives will draw useful information from the results of this survey on the consumption of fish and seafood in Quebec. Knowing which species are most popular and which are less will make it easier for the industry to effectively focus marketing efforts and set objectives in proportion to the initial consumption of the species involved. Without going as far as aiming for consumption levels comparable to those of certain countries, we can nonetheless consider a level of consumption of fish and seafood that would be more in keeping with the great variety and quality of the products available in Quebec. After all, out of the 30,000 species of fish in the world, there are surely a few that would satisfy even the most demanding consumers.

# APPENDICES

## APPENDIX A

## METHODOLOGY AND CONCEPTS USED BY OECD, FAO, STATCAN AND MAPAQ.

The OECD and STATCAN use the same methodology to assess the food consumption per capita of marine products. This figure is obtained by finding the sum total of the parameters listed below and dividing them by the country's population for the year considered, i.e.:

$$\frac{\text{PROD.} + \text{STOCKS} + \text{IMPORT} - \text{EXPORT} - \text{OTHER USES}}{\text{POPULATION}}$$

Where

**PROD.=** Country's production of marine products in the year considered;

**STOCK=** Net variation in inventories in the year considered;

**IMPORT=** Fish and seafood imported by the country;

**EXPORT=** Marine products exported by the country;

**OTHER USES=** Marine products used for purposes other than human consumption;

**POPULATION=** Country's population in the year considered.

The Statistics and Informatics Division of the Department of Fisheries and Oceans describes production as any primary processing operation by a plant or any sales activity involving a product purchased by a dealer directly from fishermen. This definition is basically the same as the one used by OECD and STATCAN.

At the international level, the FAO also establishes statistics on the consumption of fish and seafood in several countries. However, its data must be interpreted with caution, as this agency's assessment of consumption differs from that of the others. In making its estimates, the FAO uses the volume fished (landed) rather than production.

MAPAQ assesses the provincial consumption of fish per capita. Its calculations, based on the consumption data provided by STATCAN, are adjusted according to a taste-factor to take into account the specific eating habits of Quebec residents. The taste-factor is taken from a survey done every five years on the eating habits of Canadian households. Mathematically, this coefficient is expressed as follows:

$$\frac{\frac{\text{kg of fish consumed each week in Quebec}}{\text{average size of a Quebec family}}}{\frac{\text{kg of fish consumed each week in Canada}}{\text{average size of a Canadian family}}}$$

The taste factor has remained unchanged since 1986, as no survey on family food expenditures has been done since then.

Data on the consumption of fish and seafood is only available in condensed form. Fish and shellfish are regrouped by form of product. The first category includes fresh or frozen products, the second has canned products and a third lists cured fish. Some agencies add a sub-division for fresh-water fish.

## APPENDIX B

## DETAILED CALCULATION OF QUEBEC CONSUMPTION OF FISH AND SEA FOOD.

| SPECIES | PRODUC. (mt) 1 | IMPORT (mt) 2 | EXPORT (mt) 3 | NON-HUMAN USE (mt) 4 | INTER-PROVINC. PURCHASES (mt) 5 | GROSS WEIGHT AT PURCHASE (mt) 6= (1+2+5)-(3+4) | EDIBLE WEIGHT CONSUMED (mt) 7 = 6 * conv. | CONSUMPTION Kg/Quebecer 7/6672200 |
|---|---|---|---|---|---|---|---|---|
| Cod | 13139 | 1614 | 6820 | 214 | 1214 | 8933 | 7827 | 1.16 |
| Redfish | 5656 | 10 | 2963 | 1874 | 149 | 978 | 791 | 0.12 |
| Atl. & Pac. halibut | 117 | 15 | 23 | 0 | 183 | 292 | 200 | 0.03 |
| Sole | 1330 | 992 | 357 | 0 | 1595 | 3560 | 3308 | 0.49 |
| Turbot | 934 | 289 | 119 | 0 | 685 | 1789 | 1650 | 0.24 |
| Other Groundfish | 6355 | 6492 | 1680 | 3 | 1735 | 12899 | 12801 | 1.89 |
| **TOTAL GROUNDFISH** | **27531** | **9412** | **11962** | **2091** | **5561** | **28451** | **26577** | **3.93** |
| Herring[1] | 2751 | 33 | 797 | 1861 | 36 | 162 | 80 | 0.01 |
| Mackerel | 1014 | 159 | 749 | 409 | 150 | 165 | 123 | 0.02 |
| Atl. & Pac. salmon | 17 | 213 | 11 | 0 | 2588 | 2807 | 2000 | 0.30 |
| Other Pelagics | 905 | 341 | 744 | 0 | 1632 | 2134 | 1250 | 0.18 |
| **TOTAL PELAGICS** | **4687** | **746** | **2301** | **2270** | **4406** | **5268** | **3453** | **0.51** |

APPENDIX B (CONT.)

| SPECIES | PRODUC. (mt) 1 | IMPORT (mt) 2 | EXPORT (mt) 3 | NON-HUMAN USE (mt) 4 | INTER-PROVINC. PURCHASES (mt) 5 | GROSS WEIGHT AT PURCHASE (mt) 6= (1+2+5)-(3+4) | EDIBLE WEIGHT CONSUMED (mt) 7 = 6 * conv. | CONSUMPTION Kg/Quebecer 7/6672200 |
|---|---|---|---|---|---|---|---|---|
| Scallop | 390 | 891 | 168 | 0 | 663 | 1776 | 1458 | 0.22 |
| Lobster | 3009 | 504 | 1445 | 0 | 1226 | 3294 | 596 | 0.09 |
| Shrimp | 2900 | 1061 | 1066 | 0 | 1388 | 4283 | 3267 | 0.48 |
| Crab | 3607 | 84 | 2393 | 0 | 157 | 1455 | 729 | 0.11 |
| Mussels | 0 | 345 | 0 | 0 | 908 | 1253 | 121 | 0.02 |
| Oysters | 0 | 149 | 0 | 0 | 949 | 1098 | 255 | 0.04 |
| Other shellfish | 240 | 570 | 183 | 1 | 259 | 895 | 854 | 0.13 |
| **TOTAL SHELLFISH** | **10146** | **3604** | **5255** | **1** | **5550** | **14044** | **7280** | **1.09** |
| CANNED[2] | | | | | | | | **1.55** |
| **TOTAL QUEBEC** | **42364** | **13762** | **19330** | **4362** | **15517** | **47951** | **37499** | **7.08** |

1 Excluding salted, dried and marinated products.

2 Estimate of canned fish consumption according to STATCAN in 1990.

## APPENDIX C

**QUEBEC CONSUMPTION OF MARINE PRODUCTS BY SPECIES AND FORM IN 1990, EXCLUDING CANNED PRODUCTS.**

| SPECIES | FRESH kg/inhab. | FROZEN1 kg/inhab. | CURED1 kg/inhab. | TOTAL kg/inhab. |
|---|---|---|---|---|
| Cod | 0.26 | 0.88 | 0.02 | 1.16 |
| Redfish | 0.06 | 0.06 | 0 | 0.12 |
| Atl. & Pac. halibut | 0.02 | 0.01 | 0 | 0.03 |
| Sole | 0.11 | 0.38 | 0 | 0.49 |
| Turbot | 0.12 | 0.12 | 0 | 0.24 |
| Other groundfish | 0.09 | 1.8 | 0 | 1.89 |
| **TOTAL GROUNDFISH** | **0.66** | **3.24** | **0.02** | **3.93** |
| Herring | 0.01 | 0 | 0 | 0.01 |
| Mackerel | 0.01 | 0 | 0.01 | 0.02 |
| Atlan. & Pac. salmon | 0.19 | 0.07 | 0.03 | 0.30 |
| Other Pelagics | 0.12 | 0.06 | 0.01 | 0.18 |
| **TOTAL PELAGICS** | **0.33** | **0.13** | **0.05** | **0.51** |

## APPENDIX C (CONT.)

| SPECIES | FRESH kg/inhab. | FROZEN1 kg/inhab. | CURED1 kg/inhab. | TOTAL kg/inhab. |
|---|---|---|---|---|
| Scallops | 0.06 | 0.16 | 0 | 0.22 |
| Lobster | 0.06 | 0.03 | 0 | 0.09 |
| Shrimp | 0.02 | 0.46 | 0 | 0.48 |
| Crab | 0.03 | 0.08 | 0 | 0.11 |
| Mussels | 0.02 | 0 | 0 | 0.02 |
| Oysters | 0.04 | 0 | 0 | 0.04 |
| Other Shellfish | 0.05 | 0.08 | 0 | 0.13 |
| **TOTAL SHELLFISH** | **0.28** | **0.81** | **0** | **1.09** |
| **GRAND TOTAL** | **1.27** | **4.21** | **0.09** | **5.53** |

1 In some cases, a zero value may be the result of rounding off in the category involved.

## APPENDIX D

## MOST POPULAR FISH AND SHELLFISH IN QUEBEC IN 1990

| Ranking | EDIBLE WEIGHT kg/inhabitant | | GROSS WEIGHT (purchase) kg/inhabitant | |
|---|---|---|---|---|
| 1 | Cod | 1.16 | Cod | 1.32 |
| 2 | Salmon[1] | 0.99 | Salmon[1] | 1.27 |
| 3 | Shrimp[1] | 0.64 | Shrimp[1] | 0.80 |
| 4 | Tuna[1] | 0.62 | Tuna[1] | 0.62 |
| 5 | Pollock[1] | 0.52 | Sole | 0.53 |
| 6 | Sole | 0.49 | Pollock[2] | 0.52 |
| 7 | Turbot | 0.24 | Lobster | 0.49 |
| 8 | Scallop | 0.22 | Turbot | 0.27 |
| 9 | Redfish | 0.12 | Scallop | 0.27 |
| 10 | Crab | 0.11 | Crab | 0.22 |
| 11 | Trout[3] | 0.10 | Mussel | 0.19 |
| 12 | Lobster | 0.09 | Oysters | 0.16 |
| 13 | Haddock[2] | 0.09 | Redfish | 0.15 |
| 14 | Pike[2] | 0.07 | Trout[3] | 0.14 |
| 15 | Smelt[3] | 0.05 | Smelt[3] | 0.10 |
| 16 | Oysters | 0.04 | Haddock[2] | 0.09 |

## APPENDIX D (CONT.)

| Ranking | EDIBLE WEIGHT kg/inhabitant | | GROSS WEIGHT (purchase) kg/inhabitant | |
|---|---|---|---|---|
| 17 | Atl./Pac. halibut | 0.03 | Pike[2] | 0.07 |
| 18 | Scampi[4] | 0.02 | At./Pac. halibut | 0.04 |
| 19 | Mussels | 0.02 | Scampi[4] | 0.02 |
| 20 | Mackerel | 0.02 | Mackerel | 0.02 |
| 21 | Herring | 0.01 | Herring | 0.02 |

1 Results include estimates of canned fish.

2 Approximate species totals taken from Other groundfish section.

3 Approximate species totals taken from Other pelagics section.

4 Included in the Other shellfish section.

## APPENDIX E

### LEXICON

- Interprovincial purchases: marine products from other Canadian provinces consumed in Quebec.

- Human consumption per capita: edible weight of marine products consumed by each inhabitant of Quebec in the year considered.

- Total human consumption: total volume of marine products available for human consumption, by gross weight.

- Exports: volume of marine products shipped to other countries from Quebec.

- Conversion factor: statistic specific to each species and form of product, providing an indication of the consumable portion of marine products once losses have been excluded.

- Imports: marine products from outside Canada entering Quebec directly.

- **Shellfish:** scallop, lobster, shrimp, crab, mussels, oysters, scampi, clams.

- **Pelagics:** herring, mackerel, Atlantic and Pacific salmon, trout, smelt, tomcod, shark, whitefish, whiting, red sea bream, black sea bream, mahi-mahi, swordfish, pike.

- **Gross weight:** total weight of marine products when purchased, including, for some forms, non-edible parts.

- **Edible weight:** net weight of marine products excluding parts usually not eaten (shell, scales, skin, head, bones, viscera).

- **Groundfish:** cod, redfish, Atlantic and Pacific halibut, sole (American plaice), Greenland halibut, white hake, pollock (surimi), pickerel, red snapper, monkfish, skate.

- **Production:** any primary processing function by a plant or any activity for the sale of a product purchased by a dealer directly from fishermen.

- **Edible quantity:** volume of marine products in edible weight obtained using conversion factors.

## APPENDIX F

### SURVEY OF PARTICIPANTS

- Capital Fish Market Ltd, Hull
- Distributions Dupont Inc., Bonsecours
- Gidney's, Pointe-Claire
- Groupe La Mer, Montréal
- Hudon et Deaudelin Inc., Montréal-Nord
- Les Aliments Clouston Inc., Montréal
- Les Aliments Maple Leaf Inc., Montréal
- Les Pêcheries Norref Inc., Montréal
- Les Distribution Arnaud Inc., Rimouski
- Marché de poissons de Sherbrooke Inc., Sherbrooke
- Marcotte alimentation et poissonnerie Inc., Shawinigan
- Marcou poissonnerie, Anjou
- Maxi-Héritage Inc., Montréal
- Métro-Richelieu Inc., Montréal-Nord
- Pêcheries Atlantique du Québec, Montréal
- Pêcheries Atlantique du Québec, Québec
- Poissonnerie Au Grand Pêcheur, Jonquière
- Poissonnerie Belle-Marée Inc., Québec
- Poissonnerie Cowie, Granby
- Produits alimentaires Galaxie Inc., St-Jérôme
- Provigo Division Fruits de mer, Québec
- Provigo Distributions Inc., Montréal
- Produits de la mer St-Antoine-de-Tilly, St-Antoine-de-Tilly
- Steinberg Distributions Inc., Montréal

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